

CLAIMS

1. A method comprising:

writing one of a plurality of sets in an allocation memory into an allocation register, wherein the allocation memory includes a plurality of data elements arranged in the plurality of sets, each of said data elements being associated with a corresponding plurality of buffers in a buffer memory;

in response to an allocation request,

identifying a data element in the allocation register having a value corresponding to an available buffer;

changing the value of said data element to a value corresponding to an allocated buffer; and

allocating the buffer associated with said data element.

2. The method of claim 1, wherein each of the plurality of data elements comprises a single bit.

3. The method of claim 1, wherein each of the plurality of sets comprises a line in the allocation memory.

4. The method of claim 1, further comprising:
in response to a clear request for one of the
plurality of buffers,
identifying a data element associated with said buffer
in one of the allocation memory and the allocation
register; and
changing a value of said data element to the value
corresponding to an available buffer.

5. The method of claim 4, further comprising:
in response to identifying the data element associated
with said buffer in the allocation memory,
writing the set including said data element to a clear
register; and
after changing the value of said data element in the
clear register,
writing the set in the clear register to the
allocation memory.

6. The method of claim 1, further comprising:
monitoring the values of each of the data elements in
the allocation register; and
in response to each of said data elements having the
value corresponding to an allocated buffer,

writing the data elements in the allocation register back to the allocation memory;

identifying a set including at least one data element having the value corresponding to an available buffer; and writing said set to the allocation register.

7. The method of claim 6, further comprising:

providing a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets;

changing a value of a data element in the vector from the allocation register to a value corresponding to a full set in response to writing the set associated with said data element in the vector to the allocation memory; and

changing the value of said data element in the vector to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to the value corresponding to an available buffer.

8. The method of claim 7, further comprising:

identifying a set including at least one data element with the value corresponding to an available buffer by examining the values of the data elements in the vector.

9. A method comprising:

searching an allocation memory including a plurality of allocation data elements arranged in a second plurality of sets, each of said allocation data elements corresponding to an associated reclaim data element and the buffer associated with said reclaim data element;

searching a reclaim memory including a plurality of reclaim data elements arranged in a first plurality of sets, a plurality of said reclaim data elements being associated with a corresponding plurality of buffers in a buffer memory;

identifying one or more reclaim data elements to reclaim;

setting the value of said one or more reclaim data elements to a value corresponding to an available buffer; and

in a subsequent search, searching an allocation memory including a plurality of allocation data elements arranged in a second plurality of sets, each of said allocation data elements corresponding to an associated reclaim data element and the buffer associated with said reclaim data element;

comparing the allocation data elements to the associated reclaim data elements; and

changing the value of an allocation data element with a value corresponding to an allocated buffer to the value corresponding to an available buffer in response to the associated reclaim data element having the value corresponding to an available buffer.

10. The method of claim 9, further comprising:
allocating the buffer associated with said allocation data element.

11. The method of claim 9, wherein each of the plurality of allocation data elements comprises a single bit, and

wherein each of the plurality of reclaim data elements comprises a single bit.

12. The method of claim 9, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

13. The method of claim 9, further comprising:
in response to receiving a trigger signal,

identifying each allocation data element having the value corresponding to an allocated buffer; and

setting the value of each reclaim data element associated with said each allocation data element to the value corresponding to an allocated buffer.

14. The method of claim 9, further comprising:

reading one of said plurality of sets into an allocation register; and

allocating buffers based on the values of allocation data elements in the allocation register.

15. The method of claim 14, further comprising:

in response to a request to clear a buffer, identifying an allocation data element associated with the buffer; and

in response to identifying said allocation data element in the allocation register, setting a value of said allocation element to the value corresponding to an available buffer; and

in response to not identifying said allocation data element in the allocation register,

writing the set including the allocation data element to an allocation clear register and setting a value of said

allocation element to the value corresponding to an available buffer; and

writing the set including the reclaim data element associated with said allocation data element to a reclaim clear register and setting a value of said reclaim element to the value corresponding to an available buffer.

16. The method of claim 9, further comprising:

monitoring the values of the allocation data elements in the allocation register; and

in response to each of the allocation data elements in the allocation register having the value associated with an allocated buffer, writing the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

17. The method of claim 9, wherein said identifying comprises identifying the one or more reclaim data elements to reclaim based on an aging time period.

18. An apparatus comprising:

an allocation memory including a plurality of data elements arranged in a plurality of sets, each of said data elements being associated with a corresponding plurality of buffers in a buffer memory;

an allocation register; and

a buffer manager to

write one of said plurality of sets into the allocation register, and

in response to an allocation request,

identify a data element in the allocation register having a value corresponding to an available buffer,

change the value of said data element to a value corresponding to an allocated buffer, and

allocate the buffer associated with said data element.

19. The apparatus of claim 18, wherein each of the plurality of data elements comprises a single bit.

20. The apparatus of claim 18, wherein each of the plurality of sets comprises a line in the allocation memory.

21. The apparatus of claim 18, wherein the buffer manager is further operative to:

in response to a clear request for one of the plurality of buffers,

identify a data element associated with said buffer in one of the allocation memory and the allocation register; and

change a value of said data element to the value corresponding to an available buffer.

22. The apparatus of claim 21, wherein the buffer manager is further operative to:

in response to identifying the data element associated with said buffer in the allocation memory,

write the set including said data element to a clear register; and

after changing the value of said data element in the clear register,

write the set in the clear register to the allocation memory.

23. The apparatus of claim 18, wherein the buffer manager is further operative to:

monitor the values of each of the data elements in the allocation register; and

in response to each of said data elements having the value corresponding to an allocated buffer,

write the data elements in the allocation register back to the allocation memory;

identify a set including at least one data element having the value corresponding to an available buffer; and write said set to the allocation register.

24. The apparatus of claim 23, further comprising:

a line indication module to

generate a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets,

change a value of a data element in the vector to a value corresponding to a full set in response to writing the set associated with said data element in the vector to the allocation memory, and

change the value of said data element in the vector from the allocation register to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to the value corresponding to an available buffer.

25. The apparatus of claim 24, wherein the line indication module is further operative to:

identify a set including at least one data element with the value corresponding to an available buffer by examining the values of the data elements in the vector.

26. The apparatus of claim 18, wherein the allocation memory comprises an SRAM.

27. An apparatus comprising:

an allocation memory including a plurality of allocation data elements arranged in a first plurality of sets, a plurality of said allocation data elements being associated with a corresponding plurality of buffers in a buffer memory;

a reclaim memory including a plurality of reclaim data elements arranged in a second plurality of sets, each of said reclaim data elements corresponding to an associated allocation data element and the buffer associated with said allocation data element; and

a reclaim module to

search the plurality of reclaim data elements,
identify one or more reclaim data elements to reclaim,

set the value of said one or more reclaim data elements to a value corresponding to an available buffer,

in a subsequent search, compare the allocation data elements to the associated reclaim data elements,
and

change the value of an allocation data element with a value corresponding to an allocated buffer to the value corresponding to an available buffer in

response to the associated reclaim data element having the value corresponding to an available buffer.

28. The apparatus of claim 27, further comprising:
a buffer manager operative to allocate the buffer associated with said allocation data element.

29. The apparatus of claim 27, wherein each of the plurality of allocation data elements comprises a single bit, and

wherein each of the plurality of reclaim data elements comprises a single bit.

30. The apparatus of claim 27, wherein the allocation memory comprises an SRAM, and

wherein the reclaim memory comprises an SRAM.

31. The apparatus of claim 27, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

32. The apparatus of claim 27, wherein, in response to receiving a trigger signal, the reclaim module is operative to:

identify each allocation data element having the value corresponding to an allocated buffer; and

set the value of each reclaim data element associated with said each allocation data element to the value corresponding to an allocated buffer.

33. The apparatus of claim 27, further comprising:

an allocation register to store one of said plurality of sets; and

a buffer manager to allocate buffers based on the values of allocation data elements in the allocation register.

34. The apparatus of claim 33, further comprising:

an allocation clear register; and

a reclaim clear register, and

wherein the buffer manager is operative to

in response to a request to clear a buffer, identify an allocation data element associated with the buffer, and

in response to identifying said allocation data element in the allocation register, setting a value of said

allocation element to the value corresponding to an available buffer, and

in response to not identifying said allocation data element in the allocation register, writing the set including the allocation data element to the allocation clear register and setting a value of said allocation element to the value corresponding to an available buffer, and

writing the set including the reclaim data element associated with said allocation data element to the reclaim clear register and setting a value of said reclaim element to the value corresponding to an available buffer.

35. The apparatus of claim 33, wherein the buffer manager is operative to

monitor the values of the allocation data elements in the allocation register; and

in response to each of the allocation data elements in the allocation register having the value associated with an allocated buffer, write the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

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36. The apparatus of claim 33, wherein the buffer manager is operative to identify the one or more reclaim data elements to reclaim based on an aging time period.

37. An apparatus comprising:

an allocation memory including a plurality of data elements arranged in a plurality of sets, each of said data elements being associated with a corresponding plurality of buffers in a buffer memory;

an allocation register; and

a buffer manager including

means for writing one of said plurality of sets into the allocation register, and

means for, in response to an allocation request,

identifying a data element in the allocation register having a value corresponding to an available buffer,

changing the value of said data element to a value corresponding to an allocated buffer, and

allocating the buffer associated with said data element.

38. The apparatus of claim 37, wherein each of the plurality of data elements comprises a single bit.

39. The apparatus of claim 37, wherein each of the plurality of sets comprises a line in the allocation memory.

40. The apparatus of claim 37, wherein the buffer manager further comprises:

means for, in response to a clear request for one of the plurality of buffers,

identifying a data element associated with said buffer in one of the allocation memory and the allocation register, and

changing a value of said data element to the value corresponding to an available buffer.

41. The apparatus of claim 40, wherein the buffer manager further comprises:

means for writing the set including said data element to a clear register in response to identifying the data element associated with said buffer in the allocation memory; and

means for writing the set in the clear register to the allocation memory after changing the value of said data element in the clear register.

42. The apparatus of claim 37, wherein the buffer manager further comprises:

means for monitoring the values of each of the data elements in the allocation register; and

means for, in response to each of said data elements having the value corresponding to an allocated buffer,

writing the data elements in the allocation register back to the allocation memory,

identifying a set including at least one data element having the value corresponding to an available buffer, and

writing said set to the allocation register.

43. The apparatus of claim 42, further comprising:

means for generating a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets;

means for changing a value of a data element in the vector to a value corresponding to a full set in response to writing the set associated with said data element in the vector to the allocation memory; and

means for changing the value of said data element in the vector from the allocation register to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to

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the value corresponding to an available buffer.

44. The apparatus of claim 43, further comprising:
means for identifying a set including at least one
data element with the value corresponding to an available
buffer by examining the values of the data elements in the
vector.

45. The apparatus of claim 37, wherein the allocation
memory comprises an SRAM.

46. An apparatus comprising:

an allocation memory including a plurality of allocation data elements arranged in a first plurality of sets, a plurality of said allocation data elements being associated with a corresponding plurality of buffers in a buffer memory;

a reclaim memory including a plurality of reclaim data elements arranged in a second plurality of sets, each of said reclaim data elements corresponding to an associated allocation data element and the buffer associated with said allocation data element; and

a reclaim module including

means for searching the plurality of reclaim data elements,

means for identifying one or more reclaim data elements to reclaim,

means for setting the value of said one or more reclaim data elements to a value corresponding to an available buffer,

means for, in a subsequent search,

comparing the allocation data elements to the associated reclaim data elements, and

means for changing the value of an allocation data element with a value corresponding to an allocated

buffer to the value corresponding to an available buffer in response to the associated reclaim data element having the value corresponding to an available buffer.

47. The apparatus of claim 46, further comprising:
means for allocating the buffer associated with said allocation data element.

48. The apparatus of claim 46, wherein each of the plurality of allocation data elements comprises a single bit, and

wherein each of the plurality of reclaim data elements comprises a single bit.

49. The apparatus of claim 46, wherein the allocation memory comprises an SRAM, and

wherein the reclaim memory comprises an SRAM.

50. The apparatus of claim 46, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

51. The apparatus of claim 46, wherein the reclaim module further comprises:

means for, in response to receiving a trigger signal,
identifying each allocation data element having
the value corresponding to an allocated buffer, and
setting the value of each reclaim data element
associated with said each allocation data element to
the value corresponding to an allocated buffer.

52. The apparatus of claim 46, further comprising:
an allocation register to store one of said plurality
of sets; and

means for allocating buffers based on the values of
allocation data elements in the allocation register.

53. The apparatus of claim 52, further comprising:
an allocation clear register; and
a reclaim clear register;
means for, in response to a request to clear a buffer,
identifying an allocation data element associated with the
buffer;

means for, in response to identifying said allocation
data element in the allocation register, setting a value of

said allocation element to the value corresponding to an available buffer; and

means for, in response to not identifying said allocation data element in the allocation register,

writing the set including the allocation data element to the allocation clear register and setting a value of said allocation element to the value corresponding to an available buffer, and

writing the set including the reclaim data element associated with said allocation data element to the reclaim clear register and setting a value of said reclaim element to the value corresponding to an available buffer.

54. The apparatus of claim 52, further comprising:

means for monitoring the values of the allocation data elements in the allocation register; and

means for, in response to each of the allocation data elements in the allocation register having the value associated with an allocated buffer, writing the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

55. The apparatus of claim 46, further comprising:

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means for identifying the one or more reclaim data elements to reclaim based on an aging time period.

56. A system comprising:

a switching module to receive and switch packets;

a buffer memory including a plurality of buffers to store received packets; and

a buffer management module including:

an allocation memory including a plurality of data elements arranged in a plurality of sets, each of said data elements being associated with a corresponding one of the plurality of buffers in the buffer memory;

an allocation register; and

a buffer manager to

write one of said plurality of sets into the allocation register, and

in response to an allocation request,

identify a data element in the allocation register having a value corresponding to an available buffer,

change the value of said data element to a value corresponding to an allocated buffer, and

allocate the buffer associated with said data element.

57. The system of claim 56, wherein each of the plurality of data elements comprises a single bit.

58. The system of claim 56, wherein each of the plurality of sets comprises a line in the allocation memory.

59. The system of claim 56, wherein the buffer manager is further operative to:

in response to a clear request for one of the plurality of buffers,

identify a data element associated with said buffer in one of the allocation memory and the allocation register; and

change a value of said data element to the value corresponding to an available buffer.

60. The system of claim 59, wherein the buffer manager is further operative to:

in response to identifying the data element associated with said buffer in the allocation memory,

write the set including said data element to a clear register; and

after changing the value of said data element in the clear register,

write the set in the clear register to the allocation memory.

61. The system of claim 56, wherein the buffer manager is further operative to:

monitor the values of each of the data elements in the allocation register; and

in response to each of said data elements having the value corresponding to an allocated buffer,

write the data elements in the allocation register back to the allocation memory;

identify a set including at least one data element having the value corresponding to an available buffer; and
write said set to the allocation register.

62. The system of claim 61, further comprising:

a line indication module to

generate a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets,

change a value of a data element in the vector to a value corresponding to a full set in response to writing the set associated with said data element in the vector to the allocation memory, and

change the value of said data element in the vector from the allocation register to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to the value corresponding to an available buffer.

63. The system of claim 62, wherein the line indication module is further operative to:

identify a set including at least one data element with the value corresponding to an available buffer by examining the values of the data elements in the vector.

64. The system of claim 56, wherein the allocation memory comprises an SRAM.

65. A system comprising:

a switching module to receive and switch packets;

a buffer memory including a plurality of buffers to store received packets; and

a buffer management module including:

an allocation memory including a plurality of allocation data elements arranged in a first plurality of sets, a plurality of said allocation data elements being associated with a corresponding plurality of buffers in the buffer memory;

a reclaim memory including a plurality of reclaim data elements arranged in a second plurality of sets, each of said reclaim data elements corresponding to an associated allocation data element and the buffer associated with said allocation data element; and

a reclaim module to

search the plurality of reclaim data elements, identify one or more reclaim data elements to reclaim,

set the value of said one or more reclaim data elements to a value corresponding to an available buffer,

in a subsequent search, compare the allocation data elements to the associated reclaim data elements, and

change the value of an allocation data element with a value corresponding to an allocated buffer to the value corresponding to an available buffer in response to the associated reclaim data element having the value corresponding to an available buffer.

66. The system of claim 65, further comprising:
a buffer manager operative to allocate the buffer associated with said allocation data element.

67. The system of claim 65, wherein each of the plurality of allocation data elements comprises a single bit, and

wherein each of the plurality of reclaim data elements comprises a single bit.

68. The system of claim 65, wherein the allocation memory comprises an SRAM, and

wherein the reclaim memory comprises an SRAM.

69. The system of claim 65, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

70. The system of claim 65, wherein, in response to receiving a trigger signal, the reclaim module is operative to:

identify each allocation data element having the value corresponding to an allocated buffer; and

set the value of each reclaim data element associated with said each allocation data element to the value corresponding to an allocated buffer.

71. The system of claim 65, further comprising:
an allocation register to store one of said plurality of sets; and

a buffer manager to allocate buffers based on the values of allocation data elements in the allocation register.

72. The system of claim 71, further comprising:
an allocation clear register; and

a reclaim clear register, and
wherein the buffer manager is operative to
in response to a request to clear a buffer, identify
an allocation data element associated with the buffer, and
in response to identifying said allocation data
element in the allocation register, setting a value of said
allocation element to the value corresponding to an
available buffer, and
in response to not identifying said allocation data
element in the allocation register, writing the set
including the allocation data element to the allocation
clear register and setting a value of said allocation
element to the value corresponding to an available buffer,
and
writing the set including the reclaim data element
associated with said allocation data element to the reclaim
clear register and setting a value of said reclaim element
to the value corresponding to an available buffer.

73. The system of claim 71, wherein the buffer
manager is operative to
monitor the values of the allocation data elements in
the allocation register; and

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in response to each of the allocation data elements in the allocation register having the value associated with an allocated buffer, write the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

74. The system of claim 71, wherein the buffer manager is operative to identify the one or more reclaim data elements to reclaim based on an aging time period.

75. A system comprising:

a switching module including means for receiving and switching packets;

a buffer memory including a plurality of buffers for storing received packets; and

a buffer management module including:

an allocation memory including a plurality of data elements arranged in a plurality of sets, each of said data elements being associated with a corresponding plurality of buffers in a buffer memory;

an allocation register; and

a buffer manager including

means for writing one of said plurality of sets into the allocation register, and

means for, in response to an allocation request, identifying a data element in the allocation register having a value corresponding to an available buffer,

changing the value of said data element to a value corresponding to an allocated buffer, and

allocating the buffer associated with said data element.

76. The system of claim 75, wherein each of the plurality of data elements comprises a single bit.

77. The system of claim 75, wherein each of the plurality of sets comprises a line in the allocation memory.

78. The system of claim 75, wherein the buffer manager further comprises:

means for, in response to a clear request for one of the plurality of buffers,

identifying a data element associated with said buffer in one of the allocation memory and the allocation register, and

changing a value of said data element to the value corresponding to an available buffer.

79. The system of claim 78, wherein the buffer manager further comprises:

means for writing the set including said data element to a clear register in response to identifying the data element associated with said buffer in the allocation memory; and

means for writing the set in the clear register to the allocation memory after changing the value of said data element in the clear register.

80. The system of claim 75, wherein the buffer manager further comprises:

means for monitoring the values of each of the data elements in the allocation register; and

means for, in response to each of said data elements having the value corresponding to an allocated buffer,

writing the data elements in the allocation register back to the allocation memory,

identifying a set including at least one data element having the value corresponding to an available buffer, and

writing said set to the allocation register.

81. The system of claim 80, further comprising:

means for generating a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets;

means for changing a value of a data element in the vector to a value corresponding to a full set in response

to writing the set associated with said data element in the vector to the allocation memory; and

means for changing the value of said data element in the vector from the allocation register to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to the value corresponding to an available buffer.

82. The system of claim 81, further comprising:

means for identifying a set including at least one data element with the value corresponding to an available buffer by examining the values of the data elements in the vector.

83. The system of claim 75, wherein the allocation memory comprises an SRAM.

84. A system comprising:

a switching module including means for receiving and switching packets;

a buffer memory including a plurality of buffers for storing received packets; and

a buffer management module including:

an allocation memory including a plurality of allocation data elements arranged in a first plurality of sets, a plurality of said allocation data elements being associated with a corresponding plurality of buffers in a buffer memory;

a reclaim memory including a plurality of reclaim data elements arranged in a second plurality of sets, each of said reclaim data elements corresponding to an associated allocation data element and the buffer associated with said allocation data element; and

a reclaim module including

means for searching the plurality of reclaim data elements,

means for identifying one or more reclaim data elements to reclaim,

means for setting the value of said one or more reclaim data elements to a value corresponding to an available buffer,

means for, in a subsequent search,
comparing the allocation data elements to the
associated reclaim data elements, and
means for changing the value of an allocation
data element with a value corresponding to an
allocated buffer to the value corresponding to an
available buffer in response to the associated
reclaim data element having the value corresponding
to an available buffer.

85. The system of claim 84, further comprising:
means for allocating the buffer associated with said
allocation data element.

86. The system of claim 84, wherein each of the
plurality of allocation data elements comprises a single
bit, and
wherein each of the plurality of reclaim data elements
comprises a single bit.

87. The system of claim 84, wherein the allocation
memory comprises an SRAM, and
wherein the reclaim memory comprises an SRAM.

88. The system of claim 84, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

89. The system of claim 84, wherein the reclaim module further comprises:

means for, in response to receiving a trigger signal, identifying each allocation data element having the value corresponding to an allocated buffer, and setting the value of each reclaim data element associated with said each allocation data element to the value corresponding to an allocated buffer.

90. The system of claim 84, further comprising: an allocation register to store one of said plurality of sets; and

means for allocating buffers based on the values of allocation data elements in the allocation register.

91. The system of claim 90, further comprising: an allocation clear register; and a reclaim clear register;

means for, in response to a request to clear a buffer, identifying an allocation data element associated with the buffer;

means for, in response to identifying said allocation data element in the allocation register, setting a value of said allocation element to the value corresponding to an available buffer; and

means for, in response to not identifying said allocation data element in the allocation register,

writing the set including the allocation data element to the allocation clear register and setting a value of said allocation element to the value corresponding to an available buffer, and

writing the set including the reclaim data element associated with said allocation data element to the reclaim clear register and setting a value of said reclaim element to the value corresponding to an available buffer.

92. The system of claim 90, further comprising:

means for monitoring the values of the allocation data elements in the allocation register; and

means for, in response to each of the allocation data elements in the allocation register having the value

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associated with an allocated buffer, writing the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

93. The system of claim 90, further comprising:
means for identifying the one or more reclaim data elements to reclaim based on an aging time period.

94. A computer program comprising:

writing one of a plurality of sets in an allocation memory into an allocation register, wherein the allocation memory includes a plurality of data elements arranged in the plurality of sets, each of said data elements being associated with a corresponding plurality of buffers in a buffer memory;

in response to an allocation request,

identifying a data element in the allocation register having a value corresponding to an available buffer;

changing the value of said data element to a value corresponding to an allocated buffer; and

allocating the buffer associated with said data element.

95. The computer program of claim 94, wherein each of the plurality of data elements comprises a single bit.

96. The computer program of claim 94, wherein each of the plurality of sets comprises a line in the allocation memory.

97. The computer program of claim 94, further comprising:

in response to a clear request for one of the plurality of buffers,

identifying a data element associated with said buffer in one of the allocation memory and the allocation register; and

changing a value of said data element to the value corresponding to an available buffer.

98. The computer program of claim 97, further comprising:

in response to identifying the data element associated with said buffer in the allocation memory,

writing the set including said data element to a clear register; and

after changing the value of said data element in the clear register,

writing the set in the clear register to the allocation memory.

99. The computer program of claim 94, further comprising:

monitoring the values of each of the data elements in the allocation register; and

in response to each of said data elements having the value corresponding to an allocated buffer,

writing the data elements in the allocation register back to the allocation memory;

identifying a set including at least one data element having the value corresponding to an available buffer; and

writing said set to the allocation register.

100. The computer program of claim 99, further comprising:

providing a vector including a plurality of data elements, each data element being associated with a corresponding one of the plurality of sets;

changing a value of a data element in the vector from the allocation register to a value corresponding to a full set in response to writing the set associated with said data element in the vector to the allocation memory; and

changing the value of said data element in the vector to a value corresponding to an available set in response to the value of one of the data elements in said set being changed to the value corresponding to an available buffer.

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101. The computer program of claim 100, further comprising:

identifying a set including at least one data element with the value corresponding to an available buffer by examining the values of the data elements in the vector.

102. A computer program comprising:

searching an allocation memory including a plurality of allocation data elements arranged in a second plurality of sets, each of said allocation data elements corresponding to an associated reclaim data element and the buffer associated with said reclaim data element;

searching a reclaim memory including a plurality of reclaim data elements arranged in a first plurality of sets, a plurality of said reclaim data elements being associated with a corresponding plurality of buffers in a buffer memory;

identifying one or more reclaim data elements to reclaim;

setting the value of said one or more reclaim data elements to a value corresponding to an available buffer; and

in a subsequent search, searching an allocation memory including a plurality of allocation data elements arranged in a second plurality of sets, each of said allocation data elements corresponding to an associated reclaim data element and the buffer associated with said reclaim data element;

comparing the allocation data elements to the associated reclaim data elements; and

changing the value of an allocation data element with a value corresponding to an allocated buffer to the value corresponding to an available buffer in response to the associated reclaim data element having the value corresponding to an available buffer.

103. The computer program of claim 102, further comprising:

allocating the buffer associated with said allocation data element.

104. The computer program of claim 102, wherein each of the plurality of allocation data elements comprises a single bit, and

wherein each of the plurality of reclaim data elements comprises a single bit.

105. The computer program of claim 102, wherein the first plurality of sets comprises a plurality of lines in the allocation memory, and

wherein the second plurality of sets comprises a plurality of lines in the reclaim memory.

106. The computer program of claim 102, further comprising:

in response to receiving a trigger signal,
identifying each allocation data element having the value corresponding to an allocated buffer; and
setting the value of each reclaim data element associated with said each allocation data element to the value corresponding to an allocated buffer.

107. The computer program of claim 102, further comprising:

reading one of said plurality of sets into an allocation register; and
allocating buffers based on the values of allocation data elements in the allocation register.

108. The computer program of claim 107, further comprising:

in response to a request to clear a buffer,
identifying an allocation data element associated with the buffer; and
in response to identifying said allocation data element in the allocation register, setting a value of said

allocation element to the value corresponding to an available buffer; and

in response to not identifying said allocation data element in the allocation register,

writing the set including the allocation data element to an allocation clear register and setting a value of said allocation element to the value corresponding to an available buffer; and

writing the set including the reclaim data element associated with said allocation data element to a reclaim clear register and setting a value of said reclaim element to the value corresponding to an available buffer.

109. The computer program of claim 102, further comprising:

monitoring the values of the allocation data elements in the allocation register; and

in response to each of the allocation data elements in the allocation register having the value associated with an allocated buffer, writing the values of the set of allocation data elements to the allocation memory and to the reclaim memory.

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110. The computer program of claim 102, wherein said identifying comprises identifying the one or more reclaim data elements to reclaim based on an aging time period.